Multivariate Analysis of Social Network Use among Undergraduate Students in Dagon University

ဒီသုတေသနမှာ **ဒဂုံတက္ကသိုလ်** က ဘွဲ့ကြိုကျောင်းသားတွေရဲ့ **Social Network Sites (SNS)** သုံးစွဲမှုအလေ့အထတွေနဲ့ သက်ရောက်မှုတွေကို လေ့လာထားတာဖြစ်ပါတယ်။

၁။ ဒေတာ စုဆောင်းခြင်း (Data Collection)

- **ဒေတာအမျိုးအစား:** ဒီသုတေသနမှာ **Primary Data (ကိုယ်တိုင် စုဆောင်းရရှိသော ဒေတာ)** ကို အသုံးပြုထားပါတယ်။
- **စစ်တမ်းကောက်ယူသည့်နေရာ: ဒဂုံတက္ကသိုလ်**။
- **စစ်တမ်းကောက်ယူသည့်အချိန်:** ဇူလိုင်လ၊ ၂၀၁၉ ခုနှစ်။
- **နမူနာယူနည်းလမ်း (Sampling Method): Stratified Random Sampling Method (အလွှာခွဲ၍ ကျပန်းနမူနာယူနည်း)** ကို အသုံးပြုထားပါတယ်။
    - ကျောင်းသားတွေကို သူတို့ရဲ့ **ပညာသင်နှစ် (Academic Year)** အလိုက် အလွှာ ၄ ခုခွဲထားပါတယ်။ (ပထမနှစ်၊ ဒုတိယနှစ်၊ တတိယနှစ်၊ နောက်ဆုံးနှစ်)
    - အဲဒီအလွှာတစ်ခုချင်းစီကနေ **Simple Random Sampling** နည်းနဲ့ ကျောင်းသားတွေကို ထပ်ရွေးပါတယ်။
- **နမူနာအရေအတွက်: Cochran's Formula** ကို အသုံးပြုပြီး ကျောင်းသား **၃၈၆ ဦး** လိုအပ်ကြောင်း တွက်ချက်ထားပါတယ်။

၂။ ဒေတာ ယုံကြည်စိတ်ချရမှု စစ်ဆေးခြင်း (Reliability Analysis)

ဒေတာတွေ တသမတ်တည်းရှိ-မရှိ၊ ယုံကြည်ရမှုရှိ-မရှိ စစ်ဆေးဖို့ **Reliability Analysis** လုပ်ပါတယ်။

- **အသုံးပြုသော စစ်ဆေးမှု: Cronbach's Alpha Coefficient**
- **ရလဒ်:** Cronbach's Alpha တန်ဖိုးမှာ **0.779** ရပါတယ်။

- **အဓိပ္ပာယ်:** ဒီတန်ဖိုးဟာ 0.7 ထက်မြင့်နေတာကြောင့် **စုဆောင်းထားသော ဒေတာများသည် ယုံကြည်စိတ်ချရကြောင်း** ပြသနေပါတယ်။ ဆိုလိုတာက မေးခွန်းလွှာထဲက မေးခွန်းတွေအားလုံးဟာ တစ်ခုနဲ့တစ်ခု ဆက်စပ်မှုရှိပြီး တိုင်းတာလိုတဲ့ အကြောင်းအရာကို ယုံယုံကြည်ကြည် တိုင်းတာနိုင်တယ်လို့ ဆိုလိုပါတယ်။

၃။ နမူနာ လုံလောက်မှု စစ်ဆေးခြင်း (Testing for Sampling Adequacy)

MANOVA လုပ်ဖို့ ဒေတာတွေက သင့်တော်ရဲ့လားဆိုတာ စစ်ဆေးပါတယ်။

- **အသုံးပြုသော စစ်ဆေးမှု: Kaiser-Meyer-Olkin (KMO) Test**
- **ရလဒ်:** KMO တန်ဖိုးမှာ **0.753** ရပါတယ်။
- **အဓိပ္ပာယ်:** KMO တန်ဖိုးသည် 0.6 ထက်မြင့်နေပါက Factor Analysis လုပ်ရန် သင့်တော်ပါတယ်။ 0.753 ဆိုတဲ့တန်ဖိုးဟာ **ကောင်းမွန်စွာ သင့်တော်ကြောင်း** ပြသနေပါတယ်။

၄။ အဓိကသုတေသနနည်းလမ်း (Main Research Method)

ဒီသုတေသနရဲ့အဓိက ရည်ရွယ်ချက်ဖြစ်တဲ့ **SNS သုံးစွဲချိန်နဲ့ ကျောင်းသားတွေရဲ့စာကြည့်ချိန်၊ ကျန်းမာရေးနဲ့ ကိုယ်ရေးကိုယ်တာ လုံခြုံမှုအပေါ်သက်ရောက်မှုကို** လေ့လာဖို့အတွက် **Multivariate Analysis of Variance (MANOVA)** ကို အသုံးပြုထားပါတယ်။

MANOVA (Multivariate Analysis of Variance) ဆိုတာ ဘာလဲ?

- **ANOVA** ဆိုတာက **တစ်ခုတည်းသော** ရလဒ်ကိန်း (Dependent Variable) တစ်ခုအပေါ် သက်ရောက်မှုရှိတဲ့ အကြောင်းရင်းတွေကို ခွဲခြမ်းစိတ်ဖြာတာဖြစ်ပါတယ်။
- **MANOVA** ကတော့ **ရလဒ်ကိန်းအမျိုးမျိုး (Multiple Dependent Variables)** အပေါ် သက်ရောက်မှုရှိတဲ့ အကြောင်းရင်းတွေကို **တစ်ပြိုင်နက်** ခွဲခြမ်းစိတ်ဖြာပေးနိုင်တဲ့ နည်းလမ်းဖြစ်ပါတယ်။

ဒီသုတေသနမှာ MANOVA ကို ဘယ်လိုအသုံးပြုထားလဲ?

- **ရလဒ်ကိန်းများ (Dependent Variables - ၃ ခု):**
    1. **ပျမ်းမျှ တစ်ရက် စာကြည့်ချိန် (Average Study Hours per Day)**
    2. **ကျန်းမာရေး ပြဿနာများ (Health Issues)**
    3. **ကိုယ်ရေးကိုယ်တာ လုံခြုံမှု ပြဿနာများ (Privacy Issues)**
- **အကြောင်းရင်းကိန်းများ (Independent Variables):**
    1. **တစ်ရက်မှာ SNS သုံးစွဲသည့်အချိန်ကာလ**
    2. **ကျောင်းသား၏ လူမှုရေးဆိုင်ရာ အချက်အလက်များ (Demographic Characteristics)** - ကျား/မ, အသက်အပိုင်းအခြား, အလုပ်အကိုင်, ပညာသင်နှစ်, နေထိုင်ရာနေရာ

MANOVA ကို အသုံးပြုပြီး ဒီမေးခွန်းတွေကို ဖြေရှင်းထားပါတယ် -

- SNS သုံးချိန်က ကျောင်းသားရဲ့ စာကြည့်ချိန်၊ ကျန်းမာရေးနဲ့ လုံခြုံမှုကို **တစ်ပြိုင်နက်** သက်ရောက်မှုရှိလား။
- ကျောင်းသားရဲ့ **အသက်**၊ **အလုပ်** စတာတွေက ဒီရလဒ်တွေကို သက်ရောက်မှုရှိလား?
- SNS သုံးချိန်နဲ့ ကျောင်းသားရဲ့ **အသက်** (သို့) **နေထိုင်ရာနေရာ** တို့ **ပေါင်းစပ်**ပြီး ရလဒ်တွေကို သက်ရောက်မှုရှိလား? (Interaction Effect)

MANOVA ရဲ့ ရလဒ်များ (ဥပမာများ)

- SNS ကို တစ်နေ့ ၃ နာရီထက် ပိုသုံးသူတွေဟာ ၃ နာရီအောက်သုံးသူတွေထက် **စာကြည့်ချိန် ပျမ်းမျှ ၁.၄ နာရီခန့် နည်းပါး**ကြောင်း တွေ့ရပါတယ်။
- **အသက် ၁၆-၁၉ နှစ်** အရွယ်ကျောင်းသားတွေဟာ အခြားအသက်အပိုင်းအခြားတွေထက် **စာကြည့်ချိန် ပိုများ**ကြောင်း တွေ့ရပါတယ်။

- **အချိန်ပိုင်းအလုပ် လုပ်ကိုင်နေသော** ကျောင်းသားတွေဟာ အလုပ်မလုပ်သော ကျောင်းသားတွေထက် **စာကြည့်ချိန် နည်းပါး**ကြောင်း တွေ့ရပါတယ်။
- **ပုဂ္ဂလိကဆောင်တွင် နေထိုင်သော** ကျောင်းသားတွေမှာ **ကျန်းမာရေးပြဿနာ** ပိုများကြောင်း တွေ့ရပါတယ်။

📊 အနှစ်ချုပ်

ဒီသုတေသနရဲ့ Methodology ကို အတိုချုပ်ပြောရရင်...

1. **စနစ်တကျ** နမူနာရွေးယူပြီး **စစ်တမ်းကောက်ယူခဲ့တယ်**။
2. ကောက်ယူထားတဲ့ဒေတာတွေ **ယုံကြည်စိတ်ချရလား၊ MANOVA လုပ်လို့ရလား** ဆိုတာ စစ်ဆေးခဲ့တယ်။ (ဒေတာကောင်းပါတယ်)
3. **MANOVA** ဆိုတဲ့ စွမ်းရည်မြင့် စာရင်းအင်းနည်းလမ်းကို အသုံးပြုပြီး **ရလဒ် ၃ မျိုး (စာကြည့်ချိန်၊ ကျန်းမာရေး၊ လုံခြုံမှု)** ကို **တစ်ပြိုင်နက်** လွှမ်းမိုးနေတဲ့ **အကြောင်းရင်းတွေကို ခွဲခြမ်းစိတ်ဖြာခဲ့တယ်**။

ဒီနည်းလမ်းတွေကြောင့် SNS သုံးချိန်များလာတာနဲ့အမျှ ကျောင်းသားတွေရဲ့ စာကြည့်ချိန်လျော့နည်းလာတာ၊ ကျန်းမာရေးနဲ့ ကိုယ်ရေးကိုယ်တာ လုံခြုံမှုပြဿနာတွေ ပိုကြုံလာရတယ်ဆိုတဲ့ **အချက်အလက်ခိုင်ခိုင်မာမာနဲ့ တွေ့ရှိချက်တွေ** ကို ရရှိခဲ့တာဖြစ်ပါတယ်။

YANGON UNIVERSITY OF ECONOMICS

DEPARTMENT OF STATISTICS

MASTER OF APPLIED STATISTICS PROGRAMME

MULTIVARIATE ANALYSIS OF SOCIAL NETWORK USE AMONG UNDERGRADUATE STUDENTS IN DAGON UNIVERSITY

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MAS - 6

FEBRUARY, 2020

YANGON UNIVERSITY OF ECONOMICS

DEPARTMENT OF STATISTICS

MULTIVARIATE ANALYSIS OF SOCIAL NETWORK USE AMONG UNDERGRADUATE STUDENTS IN DAGON UNIVERSITY

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ABSTRACT

Social media infiltrates many areas of students' everyday lives. Social media is used by everyone for social networks. The main objective of the study is to investigate the impact of social network use on students in Dagon University. A sample of students within the age group between sixteen years and twenty-seven years was selected by the stratified random sampling. Appropriate statistical analyses such as Descriptive methods and Multivariate Analysis of Variance (MANOVA) are used in this study. It is found that the most of the respondents used Facebook to share the educational and knowledgeable information and followed by Viber to communicate with each other. The students also used social media for entertainment, online shopping, beauty and fashion, philanthropy and online games. The study found that, in comparison between the students, those who used the SNS for three hours and above per day are having less study time than the students who use the SNS for less than three hours per day. According to the research data, one hundred and forty-nine students used SNS for three hours and above per day. Moreover, the students' average study hours per day vary depending on their age group, their occupation, their academic year and their residence. The students who live at private hostel have more health issue than other students. It was also found that the age groups between sixteen years and nineteen years have the highest average study hours per day. The interaction effect of residence and SNS used time per day on the university hostel students who SNS used one hour to three hours has more privacy issue than others groups with same SNS used hour.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
B	Treatment between Sums of Squares
FAD	Facebook Addiction Disorder
GLM	General Linear Models
GPA	Grade Point Average
KMO	Kasier Meyer Olkin
MANOVA	Multivariate Analysis of Variance
MPT	Myanmar Post and Telecommunication
NCSS	National Council for the Social Studies
OSN	Online Social Networking
OSNs	Online Social Networks
PIU	Pathological Internet Use
SNS	Social Networking Sites
SPSS	Statistical Package for Social Sciences
SSP	Sum of Squares and Cross Products
W	Residual within Sum of Squares

CHAPTER I
INTRODUCTION

In the early 2000s, the Web became more personal when people accepted social networking sites. Social or public profiles (SNS), which are revealed to as network-based services are well-known and create a limited public or private profile. A list of other users who share the connection, communication and others is made in the system. The nature and specifications of these communications may differ from site to site. What makes social media sites so important is that they do not allow individuals to meet strangers, but that they allow users to see and see their social networks. SNSs have applied many technical features, but their support contains visual profiles that represent users of the system, such as their friends.

Sundén (2003) found that profiles are unique pages where one can "type oneself into being". Since their introduction, social networking websites have attracted millions of users, many of whom integrated their sites as a daily practice. Today, Facebook is the largest social network in the world.

Suter, Alexander, & Kaplan (2005) analyzed that Web-based technologies now encompass the socializing features of virtual spaces that have emerged as zones for information sharing, relationship, and community formation and extension. Bryer & Zavatarro (2001) found that social media are technologies that facilitate social interaction, make possible partnership, and enable discussion across stakeholders. These technologies now include blogs, wikis, media (audio, photo, video, text) distribution tools, networking platforms (including Facebook), and cybernetic worlds.

1.1 Rationale of the Study

Now, the world is a global village. Everybody is connected to one another in the enormous network generated by the internet. Internet tools have an improved usage level all day. The internet in Myanmar has been available since 2000 when the first internet connections were recognized. Myanmar is becoming an emergent and quick rising in internet use in South East Asia. In the early 2011, the previous level of internet censorship was significantly reduced. According to the World Internet Statistics in 2012, Myanmar had over (534,930) Internet users (1.0% of the population) due to

government limitation on pricing and thoughtful lack of facilities and infrastructure. In 2013, only around ten percent of the population had access to a phone.

In 2014, SIM cards' price is decreased with the growth of internet use in Myanmar and opening of telecommunications. Mobile and internet penetration has melodramatically improved. In 2015, the internet users meaningfully increased to (12.6%) with the introduction of faster mobile 3G internet by international telecommunications companies. In 2016, the government projected that (75%) of the population will have access to mobile phones and around (60%) of Myanmar's population uses Facebook or other forms of social media. There has been an overall growth of internet users of Myanmar and about (90%) of adults used SNS such as Facebook, Google, YouTube and so on.

Today, the number of Facebook user is (91.3%) of internet users and YouTube, Google, Twitter, Instagram and Viber are the mostly convenient social platforms in Myanmar. Many people spend about (40%) of their time online using SNS, playing online games, for academic, for commercial, for personalities and so on. SNS is becoming an essential part of life online as social websites and applications bloom. Increasing SNS use level gives chance for new software developments and making investments in this area. Thus, SNS has not only economic function but also makes persons involved in social life. In addition, it also provides chances for undemocratic actions and operations in terms of democratic society life. Identifying users' habits has an important function on determining economic, social and cultural effects of social media. Most of the people use SNS to continue connected, make friends and gratify their social needs.

In a student's life, the most important things are studying, learning good habits and acquisition knowledge to become a person with honorable character. Now, this beneficial learning process is seriously risked by students becoming tricked by the ploys of SNS. Social media and SNS use are a growing trend among students all around the world. The use of social media in education affords students with the ability to get more valuable information, to connect with learning groups and other educational systems that make education convenient. SNS tools afford students and organizations with several opportunities to improve learning methods.

Top reasons of students' SNS use are sharing document, information and opinion and entertainment. Students neglect their studies by spending time on SNS rather than reviewing or interrelating with people in person. Actively and frequently

contributing in SNS can negatively affect their grades or hamper their trips to their future careers. They like to make new friends and comment on the lives of different people. Students can create other online individualities that the real world does not allow. Constantly thinking in this way can sometimes lead to unhappiness. SNS can be used any time in daily that appear to cause poor eyesight, tension on tendons and muscles, stress and depression. Most of the students use SNS with mobile. Students have more expenses because of mobile phone bill. If other devices are used, they more expend their cost in internet and Wi-Fi bill. In current years, social media and SNS use are rapidly increasing in Myanmar. According to these situations, impact and behaviors of SNS use among university students have been studied and analyzed with the status statistical techniques such as multivariate techniques in this study.

1.2 Objectives of the Study

This study is intended to explain the impact of social network among undergraduate students in Dagon University. The objectives of the study are

- To identify the (patterns) reasons and types of social networks uses among undergraduate students in Dagon University
- To examine the effect of social networking sites used time per day on students' average study hours per day, health and privacy issues
- To explore the effect of demographic characteristics on students' average study hours per day, health and privacy issues
- To investigate the interaction effect of demographic characteristics and social network sites used time per day on students' average study hours per day, health and privacy issues.

1.3 Scope and Limitations of the Study

The study focuses on undergraduate students in Dagon University who use social networking sites. Dagon University is the biggest University in Yangon City and there are twenty-eight major subjects and a total of (24,673) students. Data from personal interviews were analyzed to study the effect of social networking sites use time per day on their average study hours per day, health and privacy issues.

1.4 Method of Study

In this study, it is to cover Dagon University but for all twenty-eight major subjects and (24,673) students, it is not easy for the researcher to collect the data. Therefore, the survey has been based on Stratified Random Sampling method with four strata as the 1st year is strata one, the 2nd year is strata two, the 3rd year is strata three and the final year is strata four and then primary data are collected from undergraduate students who are studying in Dagon University. Then, the students were selected with simple random sampling method from each stratum. The questionnaire includes five-point likert scale. To identify the patterns and types of social networks sites, the descriptive methods are applied and to investigate the interaction effect of demographic characteristics and social network sites used time per day on students' average study hours per day, health and privacy issues, the multivariate analysis is used.

1.5 Organization of the Study

This thesis included five chapters. Chapter I is the introduction. It describes the rationale of the study, the objectives, the method, the scope and limitations of the study and the organization of the study. Chapter II presents literature review. Chapter III describes the research methodology. Chapter IV mentions the analysis on the impact of social network among undergraduate students in Dagon University. Chapter V is the conclusion in which social network users' situations, findings and recommendation to social network users who are undergraduate students in Dagon University will be included.

CHAPTER II
LITERATURE REVIEW

2.1 Social Network Sites and Privacy Issues

Since the beginning of the first social networking site, SixDegrees.com at (1997), Boyd and Ellison (2008) examined that the social networking trend has grown beyond all expectations. The social networking occurrence is consuming the lives of millions of users around the world. Data privacy is a major problem in today's information era. Huge amount of data is collected by government agencies, search engines, social networking systems, hospitals, financial institutions, and other organizations, and are stored in databases. Those stored information is very crucial for individuals; people might misuse this information. The problems that exist in the real world such as theft, fraud, vandalism also exist in online Web 2 environments an identity thief.

Hildebrand (2009) discovered that new laws by the Attorney General of Australia introduced jail terms of up to ten years for individuals using networking sites such as Facebook to steal identities without having to wait for them to obtain money as a part of the fraud. Wu and Majedi et al. (2010) mentioned that social networking is becoming a necessity day by day. It is a phenomenon that is exploited by SNS, which strives to transform relationships between people and groups of people, which already exists into the online network which can be traversed and exploited.

Wu and Majedi et al. (2010) found that these networking sites are now being transformed into social networking services. And, people are keen on signing up to these social websites. But, apart from the attraction they have, there are also some hidden threats that they possess. Asif and Khan (2012) studied user’s perceptions on Facebook privacy policies. Facebook knows an enormous amount about its users. A fully filled-out Facebook profile contains about forty pieces of clearly personal data, containing name, birthday, political and religious views, online and offline contact information, sex, sexual preference and relationship status, favorite books, movies, educational and employment history and finally pictures. Facebook then offers multiple tools for users to search out and add potential contacts. By the time one person fills

information, Facebook has a reasonably comprehensive snapshot of both who you are and who you know.

O'Brien and Torres (2012) examined that Social Networking and Online Privacy: Facebook Users' Perceptions. As a result, the researchers found that Facebook users are alert and cautious when using the social networking sites. However, Facebook users are not totally informed or aware of all activities regarding with privacy on the social networking sites. However, low trust levels to date have not hindered activity on Facebook and membership with continue. Facebook users seem to be willing to push aside trust issues to achieve social interaction. The importance of trust in a social networking context is clearly questionable and perhaps different determinants for online activity exist in different online environments.

There are a number of barriers to trust in the online environment. These barriers include perceived risk, website design and content, the user themselves and privacy concerns. Leenes et al. (2008) found that privacy concerns are considered as the greatest barrier to all of them because the internet, by design, lacks of unified provisions for identifying who communicates with whom; it lacks a well-designed identity infrastructure.

Tavani (2011) discovered that privacy concerns include online information collection techniques such as cookie technology involving extreme surveillance. The use and analysis of data are also a concern due to unethical merging and data mining practices to profile customers. The instant recording and permanence of activity, loss of control and ownership of data also create barriers to online activity. Dwyer et al. (2007) analyzed that Social networking users claim to be concerned about risks to privacy, yet do little to safeguard their information. Rosenblum (2007) found that users often openly disclose detailed and personal information on these networks, comfortable living as a part of their lives online.

However, Rothery (2010) analyzed that Facebook has frequently introduced new features and services including the Newsfeed, Facebook Beacon, Facebook Advertisements and Facebook Platform, which subsequently lead to changes in the privacy settings and the privacy policy (less privacy). Each additional expansion to the website has become a growing level of discontent and concern and a general feeling that 'the company was eroding privacy and making substantial information public'.

Facebook has made millions of new "friends" in Myanmar over the last few years. At that time, the site has played the part of nationwide news outlet, emergency

relief coordinator and community water cooler – but it has also provided a backdrop for privacy invasion and cyber bullying.

By Mid-May, Myanmar had racked up more than (9.7) million monthly active users – meaning about (19%) of the country is active on Facebook, according to data from Amara Digital Marketing Agency. Facebook can be dangerous for users who lack in digital literacy – especially those from rural areas. “People just do not know that they are posting things in public,” adding some may not be able to change their settings without knowing English.

2.2 Social Network Sites Impact on their Study Hours

Browning, L., et al. (2011) found that today’s college students (which consist of Generation Y or also named Millennial) are exposed to all types of technologies in many aspects of their lives. Cassidy, E., et al. (2011) mentioned that on a daily basis, they use desktop computers, laptops, E-readers, tablets, and cell phones to actively engage in social networking, text messaging, blogging, content sharing, online learning, and much more.

Paul, J., et al. (2012) discovered that online social networks (OSNs) have permeated all generations of Internet users, becoming a protuberant communication tool, particularly in the student community. Thus, academic institutions and faculties are increasingly using social networking sites, such as Facebook and LinkedIn, to connect with current and potential students and to deliver instructional content.

Lenhart, et al, (2010) disagreed with the previous statement, such as says that despite the popularity of social media for personal use, only a low percentage of students and faculty use them for academic practice. Online social networking (OSN) sites, such as Facebook, Twitter and Myspace, are used on a regular basis by many millions of people. The majority of this online networking community is made up of college students. Dahlstrom, et al. (2011) said that a recent survey of (3000) students from across the US revealed that (90%) of college students used Facebook and (37%) used Twitter.

Reynol Junco (2012) found that time spent on Facebook and checking Facebook were negatively related to overall GPA, and time spent on Facebook is negatively related to time spent for studying. In addition, the ability of time spent on Facebook to overall GPA significantly shows that there may be negative academic effects for students who use Facebook in certain ways.

Besides, Paul, J., et al. (2012) studied the effect of online social networking on student academic performance. The researcher's results revealed a statistically significant negative relationship between time spent by students on OSN and their academic performance. Time spent on OSN is shown to have negative impact on academic performance. As time spent on social networking sites increases, the academic performance of the students seems to decline.

Smith (2012) found that Facebook has nearly one billion users worldwide with more than Common Sense Media (2012) (90%) of teens and Junco (2011) college students were actively engaged. However, according to the results, the relationship between the impact of social media and the student's studying hours showed that participants who accessed Facebook one or more times during the study period had failed in their exam.

Furthermore, Junco (2011) discovered that sharing links and checking up with friends on Facebook more often predicted higher college grades, making status updates more often predicted lower grades, and that overall GPA dropped to twelve points for every ninety-three minutes above the average of one hundred and six minutes per day spent on Facebook.

2.3 Social Networking Websites and Health

Every human being fear to have health problems. Once someone has health issues, his or her life will be affected. Therefore, people need to be careful and cherish their good health. To date, a health issue, not only comes from the so called environment of the person, but also within the web 2.0 environment. In the previous years, the main discussion issue was the addiction to television, today's issues deal with internet addiction and the increased amount of time young people and adults spend is on searching the internet.

Christakis, D., et al (2009) discovered that internet use plays an important role in the lives of today's young adults, understanding possible health implications is of clinical importance. In particular, problematic internet use (PIU) is a new and growing health concern for adolescents and young adults. PIU lacks a homogenous definition, but it has also been referred to as internet addiction.

Lenhart et al., (2005) found that young adults also may be the population most at risk for the development of PIU because adolescents and young adults have the highest rates of internet use and frequency. Dr. Sam Thomas (2011) examined the

addiction in Internet chatting: A factual study using the modified Technology Acceptance Model. The study found that excessive time on social network sites may lead to internet addiction. Students around the world spend a lot of time on social network which leads to major consequences. Kandell (1998); Griffiths (2000) mentioned that excessive time spent in this manner could lead to the problematic behavior known as Internet addiction. Internet addiction is viewed as a psychological dependence on or a behavioral addiction to the Internet, resulting in excessive usage.

Besides, many researchers have argued that the attractiveness of the Internet could lead to excessive use. Griffiths (2000) discovered that past research has described this phenomenon as Internet addiction. On the other hand, Young (1998) argued that the Internet itself is not addictive, but highly interactive applications like online chatting can be addictive.

The Star (2010) examined that enthusiasm for Facebook is particularly obvious in Myanmar. Even though Facebook is used to connect with people and improve the social life of students, it was also noticed that excessive Facebook use brings bad consequences. Fenichel (2009) found that the term Facebook Addiction Disorder (FAD) was referred as to the negative consequences of excessive use of Facebook. The researchers revealed that students exhibit some addictive symptoms, namely, Salience (both cognitive and behavioral), Loss of Control, Withdrawal and Relapse and Reinstatement. The findings are similar to those of other studies by Balakrishnan & Raj (2012); Walsh et al., (2010) found that the findings have revealed addictive behavior in using mobile phones, Charlton & Danforth (2007) online games and Charlton (2002) the Internet.

Young (1998) analyzed that internet overuse can bring health problems known as a mental disorder which is named Pathological Internet Use – PIU. Bonacic (2010) discovered that the American Psychological Association classified the overuse of the internet services as an addiction. Now, the PIU is included in the group of addictions together with drug and alcohol addictions, addiction to video games, gambling and some of the eating disorders.

Mekinc, J., et al.(2013) found out that the increased use of the internet, Facebook profiles, publication of personal data expressed the signs of internet addiction among scholars in the upper grades. According to the results of this study, using Facebook increases the likelihood of addiction to the internet. While establishing new friendships and socializing, children thought the Internet can satisfy their need for

contact, for belonging, however, the excessive use of social networks brings the risk of developing an internet addiction.

2.4 Conceptual Framework

Pempek et al. (2009) asked students to log their daily time spent on Facebook in a diary for 1 week and found that students reported spending an average of (27.93) minutes per day on weekdays and (28.44) minutes per day at weekends. Additionally, recent studies by Ellison et al. (2011), Kalpidou et al. (2011), and Junco (2012a, b) have shown that students spent around 100 minutes on the SNSs per day. Nalwa & Annand (2003) recommended that those who are addicted users love to use the internet to set back their personal and professional responsibilities in which the final outcome is poor academic performance.

Karpinski (2009) found that social media platforms (Facebook, whatsapp etc) users who usually devoted lesser time to their studies were compared to nonusers and subsequently the former had lower GPAs. According to Kubey (2001), there is a correlation between academic performance and the dependency on social media platforms.

Twenge (2017) discovered that teens who spent five or more hours a day online were seventy-one percent more likely than those who spent less than an hour a day to have at least one suicidal risk factor (depression, thinking about suicidal, making a suicide plan or attempting suicide). Viner and Gireesh et al. (2019) mentioned that mental health harms related to very frequent social media use in girls might be due to a combination of exposure to cyberbullying or displacement of sleep or physical activity, whereas other mechanisms appear to be operative in boys. Interventions to promote mental health should include efforts to prevent or increase resilience to cyberbullying and ensure adequate sleep and physical activity in young people.

The differences in SNS used time have effect on individual’s average study hours per day, health and privacy issues. Similarly, depending on the demographic characteristic such as gender, age group, occupation, education level and residence, and there can be difference in SNS used time per day and average study hours per day, health issue and privacy issue can be affected. Therefore, the use of SNS has the positive and negative effect on the youths that conceptual framework is constructed as the follows.

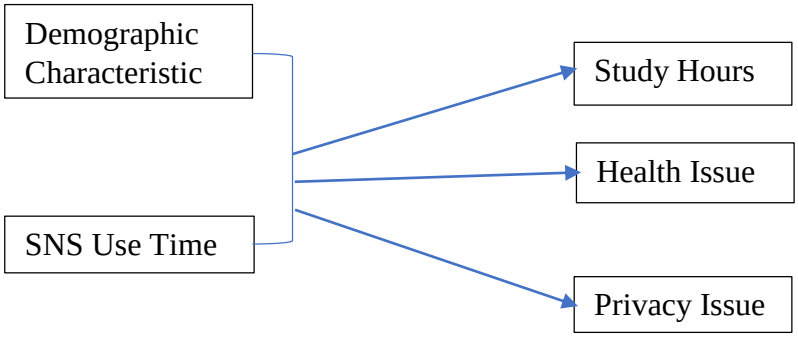

Figure 2.1 Author's Own Compilation (2019)

CHAPTER III
RESEARCH METHODOLOGY

This chapter presents the theoretical background of the reliability analysis and testing for sampling adequacy, multivariate data analysis (MANOVA) and sample survey design.

3.1 Survey Design

To obtain the required information on social media utilization and the effects of social media, the survey was conducted in Dagon University. The study population was (24,673) students. The data collection method used in this survey was personal interview method. Questionnaire is formed by using different questions types: dichotomous question type (yes or no question), likert scale question type (using five points) ranging from "strongly agree" to "strongly disagree", scaling question type, multiple choice question type and closed-ended question type, in order to get sufficient answers.

3.1.1 Sampling Method and Sample Size Determination

There are (24,673) undergraduate students in total under twenty-eight different majors at Dagon University and used sample random sampling method.

In this study, Cochran's (1977) sample size formula for categorical data is used. Assume that the alpha level is (0.05) and is planned to use in proportional variable, set the level of acceptable error at (5%) and estimated standard deviation of the scale as (0.5).

$$n_0 = \frac{Z^2(P)(Q)}{d^2}$$

$$n_0 = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384$$

Where,

n_0 = the sample size

Z = value of selected alpha level of 0.025 in each tail = 1.96

(P)(Q) = estimate of variance = 0.25

(Maximum possible proportion (0.5) produces maximum possible sample size)

d = margin of error for proportion being estimated = 0.05

Therefore, a population of the required sample size is at least (384).

3.1.2 Sample Size Allocation for Each Stratum

There are four different groups by academic years in Dagon University for undergraduate students such as the first year, the second year, the third year and the final year. For proportional allocation method, the size of the sample in each stratum is taken in proportion to the size of the stratum. (386) respondents from Dagon University are chosen to cover the sampling error.

Table 3.1 Students in Dagon University

Group	Population	Sample Students
1st Year	8,488	123
2nd Year	6,037	97
3rd Year	5,005	88
Final	5,143	78
Total	**24,673**	**386**

Source: Survey Data, 2019

3.2 Reliability Analysis

Reliability is the scale construction counterpart of precision and accuracy in physical measurement. Reliability can be thought of as consistency in measurement. To establish the reliability of the data, the reliability coefficient (Cronbach Alpha) was verified. There are a number of different reliability coefficients. One of the most commonly used is Cronbach's alpha. Cronbach's alpha can be interpreted as a correlation coefficient; it ranges a value from 0 to 1. Robinson and Shaver (1973) suggested that if Alpha is greater than 0.7, it mean high reliability and if Alpha is smaller than 0.3, it means low reliability. Moreover, it is often said that Crobach's Alpha is, more reliability scale.

3.2.1 Reliability Test

Before using the factor analysis, it is very important to test the reliability of the dimensions in the questionnaires. Cronbach's alpha, a statistical test was used to examine the internal consistency of attributes and was determined for each dimension. This statistical test shows that the attributes are related to each other and to the composite score. The composite score for each section of the questionnaires was obtained by summing the scores of individual statements. Cronbach's alpha is defined as

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{k} S_i^2}{S_T^2}\right]$$

Where

α =Cronbach's alpha,

K= Number of Statement

S_i^2 = variance of each statement

S_T^2 = variance for sum of all items

If alpha value is high, then this suggests that all of the items are reliable and the entire test is internally consistent. If alpha is low, then at least one of items are unreliable and must be identified via item analysis procedure. However, the Cronbach's alpha value should be above 0.7.

3.2.2 Testing for Sampling Adequacy

Kaiser-Meyer-Olkin (KMO) Test is a measure of how suited the data is for Factor Analysis. The test measures sampling adequacy for each variable in the model and for the complete model. The statistic is a measure of the proportion of variance among variables that might be common variant. The lower the proportion, the more suited the data is for Factor Analysis.

KMO return values between 0 and 1. A rule of thumb is for interpreting the statistic:

KMO value less than 0.8 indicates that the sampling is adequate.

KMO value less than 0.6 indicates that the sampling is not adequate and that remedial action should be taken.

KMO values that are close to zero mean that there are large partial correlations compared to the sum of correlations. In other words, there are widespread correlations which are a large problem for factor analysis.

3.3 Multivariate Analysis of Variance (MANOVA)

The extension of univariate analysis of variance (ANOVA) to the involvement of multiple dependent variables is termed multivariate analysis of variance (MANOVA). The hypotheses tested with MANOVA are similar to those tested with ANOVA except that sets of means replace the individual means specified in ANOVA. In a one-way MANOVA design, for example, the hypothesis tested is that the populations from which the samples are selected have the same means for all dependent variables. The MANOVA command also allows to perform a stepdown analysis if theoretical reasons for ordering dependent variables are available. The ordering of these dependent variables can be tested using prior dependent variables as covariates. The choice between univariate and stepdown F may be difficult. When there is little correlation among the dependent variables, univariate F is acceptable. However, when dependent variables are highly correlated, stepdown F is preferable.

3.3.1 Comparing Several Multivariate Population Means

According to Richard A. Johnson and Dean W. Wichern (2013), random samples, collected from each g populations, are arranged as

$$\begin{aligned} &\text{Population 1: } \mathbf{X_{11}, X_{12}, X_{13}, \dots, X_{1n_1}} \\ &\text{Population 2: } \mathbf{X_{21}, X_{22}, X_{23}, \dots, X_{2n_2}} \\ &\quad\vdots \qquad\qquad\qquad \vdots \\ &\text{Population g: } \mathbf{X_{g1}, X_{g2}, X_{g3}, \dots, X_{gn_g}} \end{aligned} \tag{3.1}$$

MANOVA is used first to investigate whether the population mean vectors are the same and, if not, it means that components differ significantly.

3.3.2 MANOVA Model for Comparing "g" Population Mean Vectors

According to Richard A. Johnson and Dean W. Wichern (2013), MANOVA model for comparing "g" population mean vectors is

$$\boldsymbol{X_{lj} = \mu + \tau_l + e_{lj}}\ , \text{j} = 1, 2, \dots, \text{n}_l \text{ and } l = 1,2, \dots, \text{g} \tag{3.2}$$

where the e_{lj} are independent $N_p\,(0, \sum)$ variables. Here the parameter vector μ is an overall mean (level), and τ_l represents the l^{th} treatment effect with $\sum_{l=1}^{g} n_l \tau_l = 0$. The errors for the components of $\boldsymbol{X_{lj}}$ are correlated, but the covariance matrix $\sum$ is the same for all populations.

A vector of observations may be decomposed as suggested by the model. Thus,

$$\mathbf{x}_{lj} \quad = \quad \bar{\mathbf{x}} \quad + \quad (\bar{\mathbf{x}}_l - \bar{\mathbf{x}}) \quad + \quad (\mathbf{x}_{lj} - \bar{\mathbf{x}}_l) \qquad (3.3)$$

(observation) $\begin{pmatrix}\text{overall sample}\\ \text{mean } \hat{\mu}\end{pmatrix}$ $\begin{pmatrix}\text{estimated treatment}\\ \text{effect } \hat{\tau}_l\end{pmatrix}$ $\begin{pmatrix}\text{residual}\\ \hat{e}_{lj}\end{pmatrix}$

The product $(\mathbf{x}_{lj} - \bar{\mathbf{x}})(\mathbf{x}_{lj} - \bar{\mathbf{x}})'$ can be written as

$$\begin{aligned}(\mathbf{x}_{lj} - \bar{\mathbf{x}})(\mathbf{x}_{lj} - \bar{\mathbf{x}})' &= [(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l) + (\bar{\mathbf{x}}_l - \bar{\mathbf{x}})]\,[(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l) + (\bar{\mathbf{x}}_l - \bar{\mathbf{x}})]' \\ &= (\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)' + (\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})' \\ &\quad + (\bar{\mathbf{x}}_l - \bar{\mathbf{x}})(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)' + (\bar{\mathbf{x}}_l - \bar{\mathbf{x}})(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})'\end{aligned}$$

The sum over *j* of the middle two expressions is the zero matrix,

because $\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l) = 0$.

Hence, summing the cross product over *l* and *j* yields

$$\begin{aligned}\sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}})(\mathbf{x}_{lj} - \bar{\mathbf{x}})' &= \sum_{l=1}^{g} n_l(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})' \\ &\quad + \sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)' \qquad (3.4)\end{aligned}$$

$\begin{pmatrix}\text{total (corrected) sum of}\\ \text{squares and cross products}\end{pmatrix}$ = $\begin{pmatrix}\text{treatment (Between) sum of}\\ \text{squares and cross products}\end{pmatrix}$ + $\begin{pmatrix}\text{residual (Within) sum of}\\ \text{squares and cross products}\end{pmatrix}$

The within sum of squares and cross products matrix can be expressed as

$$\begin{aligned}\mathrm{W} &= \sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)' \\ &= (n_1 - 1)\mathbf{S}_1 + (n_2 - 1)\mathbf{S}_2 + \cdots + (n_g - 1)\mathbf{S}_g\end{aligned}$$

where $\mathbf{S}_l$ is the sample covariance matrix for the l^{th} sample.

The hypothesis of no treatment effects,

$$H_0: \tau_1 = \tau_2 = \cdots = \tau_g = 0$$

is tested by considering the relative sizes of the treatment and residual sums of squares and cross products. Formally, the calculations leading to the test statistics in a MANOVA table are shown in the Table (3.2).

Table 3.2 MANOVA Table for Comparing Population Mean Vectors

Source of Variation	**Matrix of Sum of Squares and Cross Products (SSP)**	**Degrees of Freedom (d.f)**
Treatment	$\mathbf{B} = \sum_{l=1}^{g} n_l(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})(\bar{\mathbf{x}}_l - \bar{\mathbf{x}})'$	g – 1
Residual (Error)	$\mathbf{W} = \sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)'$	$\sum_{l=1}^{g} n_l - g$
Total (corrected for the mean)	$\mathbf{B} + \mathbf{W} = \sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj} - \bar{\mathbf{x}})(\mathbf{x}_{lj} - \bar{\mathbf{x}})'$	$\sum_{l=1}^{g} n_l - 1$

Source: Applied Multivariate Statistical Analysis Sixth Edition (2013)

One test of $H_0: \tau_1 = \tau_2 = \cdots = \tau_g = 0$ involves generalized variances. We reject H_0 if the ratio of generalized variances

$$\Lambda^* = \frac{|\mathbf{W}|}{|\mathbf{B}+\mathbf{W}|} = \frac{|\sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj}-\bar{\mathbf{x}}_l)(\mathbf{x}_{lj}-\bar{\mathbf{x}}_l)'|}{|\sum_{l=1}^{g}\sum_{j=1}^{n_l}(\mathbf{x}_{lj}-\bar{\mathbf{x}})(\mathbf{x}_{lj}-\bar{\mathbf{x}})'|} \quad (3.5)$$

is too small. The quality $\Lambda^* = |\mathbf{W}|/|\mathbf{B}+\mathbf{W}|$, proposed originally by Wilks corresponds to no treatment effects in the univariate case. Wilks' lambda has the virtue of being convenient and related to the likelihood ratio criterion. The exact distribution of Λ^*can be derived for the special cases listed in Table (3.3). For other cases and large sample sizes, a modification of Λ^*due to Bartlett's test can be used.

Table 3.3 Distribution of Wilks' Lambda

No. of Variables	No. of Groups	Sampling Distribution for Multivariate Normal Data
p = 1	g ≥ 2	$\left(\frac{\sum n_l - g}{g-1}\right)\left(\frac{1-\Lambda^*}{\Lambda^*}\right) \sim \mathbf{F_{g-1,\sum n_l - g}}$
p = 2	g ≥ 2	$\left(\frac{\sum n_l - g - 1}{g-1}\right)\left(\frac{1-\sqrt{\Lambda^*}}{\sqrt{\Lambda^*}}\right) \sim \mathbf{F_{2(g-1),2(\sum n_l - g - 1)}}$
p ≥ 1	g = 2	$\left(\frac{\sum n_l - p - 1}{p}\right)\left(\frac{1-\Lambda^*}{\Lambda^*}\right) \sim \mathbf{F_{p,\sum n_l - p - 1}}$
p ≥ 1	g = 3	$\left(\frac{\sum n_l - p - 2}{p}\right)\left(\frac{1-\sqrt{\Lambda^*}}{\sqrt{\Lambda^*}}\right) \sim \mathbf{F_{2p,2(\sum n_l - p - 2)}}$

Source: Applied Multivariate Statistical Analysis Sixth Edition (2013)

Bartletts' test has shown that if H_0 is true and $\sum n_l = n$ is large,

$$-\left(n-1-\frac{(p+g)}{2}\right)\ln\Lambda^* = -\left(n-1-\frac{(p+g)}{2}\right)\ln\left(\frac{|W|}{|B+W|}\right) \quad (3.6)$$

has approximately a chi-square distribution with p(g-1) degree of freedom. Consequently, for $\sum n_l = n$ large, we reject H_0 at significance level α if

$$-\left(n-1-\frac{(p+g)}{2}\right)\ln\left(\frac{|W|}{|B+W|}\right) > \chi^2_{p(g-1)}(\alpha) \quad (3.7)$$

where $\chi^2_{p(g-1)}(\alpha)$ is the upper (100 α) the percentile of a chi-square distribution with p(g-1) degrees of freedom.

3.3.3 Multivariate Two-Way Fixed-Effects Model with Interaction

Processing by analogy, Richard A. Johnson and Dean W. Wichern (2013) specify the two-way fixed-effects model for a *vector* response consisting of p components

$$x_{lkr} = \mu + \tau_l + \beta_k + \gamma_{lk} + e_{lkr} \quad (3.8)$$

l = 1,12, …, g

k = 1,2, …, b

r = 1,2, …, n

where $\sum_{l=1}^{g} \tau_l = \sum_{k=1}^{b} \beta_k = \sum_{l=1}^{g} \gamma_{lk} = \sum_{k=1}^{b} \gamma_{lk} = 0$.

The vectors are all of order $\boldsymbol{p}$ x 1, and the $\boldsymbol{e_{lkr}}$ are independent $N_p(0, \sum)$ random vectors. Thus, the responses consist of p measurements replicated n times at each of the possible combinations of levels of factors 1 and 2.

Johnson, Richard A. and Wichern, Dean W. (2013) can decompose the observation vectors $\mathbf{x_{lkr}}$ as

$$x_{lkr} = \bar{x} + (\bar{x}_{l\cdot} - \bar{x}) + (\bar{x}_{\cdot k} - \bar{x}) + (\bar{x}_{lk} - \bar{x}_{l\cdot} - \bar{x}_{\cdot k} + \bar{x}) + (x_{lkr} - \bar{x}_{lk}) \quad (3.9)$$

where $\bar{x}$ is the overall average of the observation vectors, $\bar{x}_{l\cdot}$ is the average of the observation vectors at the l^{th} level of the factor 1, $\bar{x}_{\cdot k}$ is the average of the observation vectors at the k^{th} level of factor 2, $\bar{x}_{lk}$ is the average of the observation vectors at the l^{th} level of the factor 1 and k^{th} level of factor 2.

The breakups of the sum of squares and cross products and degrees of freedom:

$$\begin{aligned}\sum_{l=1}^{g}\sum_{k=1}^{b}\sum_{r=1}^{n}(x_{lkr} - \bar{x})(x_{lkr} - \bar{x})' &= \sum_{l=1}^{g} bn\,(\bar{x}_{l\cdot} - \bar{x})(\bar{x}_{l\cdot} - \bar{x})' \\ &+ \sum_{k=1}^{b} gn\,(\bar{x}_{\cdot k} - \bar{x})(\bar{x}_{\cdot k} - \bar{x})' \\ &+ \sum_{l=1}^{g}\sum_{k=1}^{b} n\,(\bar{x}_{lk} - \bar{x}_{l\cdot} - \bar{x}_{\cdot k} + \bar{x})(\bar{x}_{lk} - \bar{x}_{l\cdot} - \bar{x}_{\cdot k} + \bar{x})' \\ &+ \sum_{l=1}^{g}\sum_{k=1}^{b}\sum_{r=1}^{n}(x_{lkr} - \bar{x}_{lk})(x_{lkr} - \bar{x}_{lk})' \quad (3.10)\end{aligned}$$

$$gbn - 1 = (g - 1) + (b - 1) + (g - 1)(b - 1) + gb(n - 1) \quad (3.11)$$

Again, the generalization from the univariate to the multivariate analysis consists simply of replacing a scalar such as $(\bar{x}_{l\cdot} - \bar{x})^2$ with the corresponding matrix $(\bar{x}_{l\cdot} - \bar{x})(\bar{x}_{l\cdot} - \bar{x})'$. The MANOVA table is as the following:

Table 3.4 MANOVA Table for Comparing Factors and Their Interaction

Source of variation	Matrix of sum of squares and cross products (SSP)	Degrees of freedom (d.f.)
Factor 1	$\mathrm{SSP}_{\mathrm{fac1}} = \sum_{l=1}^{\mathrm{g}} bn\,(\bar{\mathrm{x}}_{l\cdot} - \bar{\mathrm{x}})(\bar{\mathrm{x}}_{l\cdot} - \bar{\mathrm{x}})'$	$\mathrm{g} - 1$
Factor 2	$\mathrm{SSP}_{\mathrm{fac2}} = \sum_{k=1}^{\mathrm{b}} \mathrm{g}n\,(\bar{\mathrm{x}}_{\cdot k} - \bar{\mathrm{x}})(\bar{\mathrm{x}}_{\cdot k} - \bar{\mathrm{x}})'$	$\mathrm{b} - 1$
Interaction	$\mathrm{SSP}_{int} = \sum_{l=1}^{\mathrm{g}}\sum_{k=1}^{\mathrm{b}} n\left(\bar{\mathrm{x}}_{lk} - \bar{\mathrm{x}}_{l\cdot} - \bar{\mathrm{x}}_{\cdot k} + \bar{\mathrm{x}}\right)(\bar{\mathrm{x}}_{lk} - \bar{\mathrm{x}}_{l\cdot} - \bar{\mathrm{x}}_{\cdot k} + \bar{\mathrm{x}})'$	$(\mathrm{g} - 1)(\mathrm{b} - 1)$
Residual (Error)	$\mathrm{SSP}_{res} = \sum_{l=1}^{\mathrm{g}}\sum_{k=1}^{b}\sum_{r=1}^{n}(\mathrm{x}_{lkr} - \bar{\mathrm{x}}_{lk})(\mathrm{x}_{lkr} - \bar{\mathrm{x}}_{lk})'$	$\mathrm{gb}(n - 1)$
Total (corrected)	$\mathrm{SSP}_{cor} = \sum_{l=1}^{\mathrm{g}}\sum_{k=1}^{b}\sum_{r=1}^{n}(\mathrm{x}_{lkr} - \bar{\mathrm{x}})(\mathrm{x}_{lkr} - \bar{\mathrm{x}})'$	$\mathrm{gb}n - 1$

Source: Applied Multivariate Statistical Analysis Sixth Edition (2013)

A test (the likelihood ratio test)[5] of

$H_0: \gamma_{11} = \gamma_{12} = \cdots = \gamma_{\mathrm{g}b} = 0$ (no interaction effect) (3.12)

versus

H_1: At least one $\gamma_{lk} \neq 0$

is conducted by rejecting H_0 for small values of the ratio

$$\Lambda^* = \frac{|\mathrm{SSP}_{res}|}{|\mathrm{SSP}_{int} + \mathrm{SSP}_{res}|} \quad (3.13)$$

For large samples, Wilks' lambda, Λ^*, can be referred to chi-square percentile. Using Bartlett's multiplier to improve the chi-square approximation, rejected

$H_0: \gamma_{11} = \gamma_{12} = \cdots = \gamma_{\mathrm{g}b} = 0$ at the α level if

$-\left[\mathrm{gb}(\mathrm{n} - 1) - \frac{p+1-(\mathrm{g}-1)(\mathrm{b}-1)}{2}\right]\ln\Lambda^* > \chi^{\,2}_{(\mathrm{g}-1)(\mathrm{b}-1)\mathrm{p}}(\alpha)$ is the upper $(100\alpha)^{\mathrm{th}}$ percentile of a chi-square distribution with $(\mathrm{g} - 1)(\mathrm{b} - 1)p$ degrees of freedom.

Ordinarily, the test for interaction is carried out before the tests for main factor effects. If interaction effects exist, the factor effects do not have a clear interpretation. From a practical standpoint, it is not advisable to process with the additional multivariate tests. Instead, p univariate two-way analysis of variance (one for each variable) are often conducted to see whether the interaction appears in some responses

but not others. Those responses without interaction may be interpreted in terms of additive factor 1 and 2 effects, provided that the latter effects exist. In any event, interaction posts with treatment sample means replacing expected values, best clarify the relative magnitudes of the main and interaction effects.

In the multivariate model, test for factor 1 and factor 2 main effect as follow. First consider the hypothesis H_0: $\tau_1 = \tau_2 = \cdots = \tau_{\mathrm{g}} = 0$ and H_1 is at least one $\tau_l \neq 0$. These hypotheses specify no factor 1 effects and some factor 1 effects, respectively. Let

$$\Lambda^* = \frac{|\mathrm{SSP_{res}}|}{|\mathrm{SSP_{fac1}} + \mathrm{SSP_{res}}|} \tag{3.14}$$

so that small values of $\Lambda^*$are consistent with H_1. Using Bartlett's correction, the likelihood ratio test is as follows:

Reject H_0: $\tau_1 = \tau_2 = \cdots = \tau_{\mathrm{g}} = 0$ (no factor 1 effects) at level α if

$$-\left[\mathrm{gb(n-1)} - \frac{p+1-(\mathrm{g}-1)}{2}\right] \ln \Lambda^* > \chi^2_{(\mathrm{g}-1)p}(\alpha) \tag{3.15}$$

where $\Lambda^*$is given by (3.14) and $\chi^2_{(\mathrm{g}-1)p}(\alpha)$ is the upper $(100\alpha)^{\text{th}}$ percentile of a chi-square distribution with $(\mathrm{g}-1)p$ d.f.

In a similar manner, factor 2 effects are tested by considering

H_0: $\beta_1 = \beta_2 = \cdots = \beta_b = 0$ and H_1 is at least one $\beta_k \neq 0$. Small values of

$$\Lambda^* = \frac{|\mathrm{SSP_{res}}|}{|\mathrm{SSP_{fac2}} + \mathrm{SSP_{res}}|} \tag{3.16}$$

are consistent with H_1. Once again, for large samples and using Bartlett's correction:

Reject H_0: $\beta_1 = \beta_2 = \cdots = \beta_b = 0$ (no factor 2 effects) at level α if

$$-\left[\mathrm{gb(n-1)} - \frac{p+1-(b-1)}{2}\right] \ln \Lambda^* > \chi^2_{(\mathrm{b}-1)p}(\alpha) \tag{3.17}$$

where Λ^* is given by (3.16) and $\chi^2_{(\mathrm{b}-1)p}(\alpha)$ is the upper $(100\alpha)^{\text{th}}$ percentile of a chi-square distribution with $(\mathrm{b}-1)p$ degrees of freedom.

CHAPTER IV
ANALYSIS OF SOCIAL NETWORK USE AMONG UNDERGRADUATE STUDENTS IN DAGON UNIVERSITY

To understand the Social Network use among Undergraduate Students, altogether 386 respondents from Dagon University are chosen by using the predefined questionnaire in order to cover the sampling error. Questionnaire is formed by using different questions types: dichotomous question type (yes or no question), likert scale question type (using five points) ranging from "strongly agree" to "strongly disagree", scaling question type, multiple choice question type and closed-ended question type, are used in order to get sufficient answers to complete the research objectives. For the data analysis, reliability test, MANOVA, interaction analysis and descriptive data analysis are conducted.

4.1 Demographic Characteristics and Usage of Social Networking Sites

4.1.1 Respondents by Demographic Characteristics

The demographic characteristics of respondents are shown in Table (4.1). In classification of the number of respondents, (39.6%) of the respondents are males and (60.4%) of the respondents are females.

According to the age groups of the students, (46.6%) of the respondents were followed by twenty to twenty-three years which made up the largest group. Twenty-seven percent and twenty-six percent of the students were followed by sixteen to nineteen years and twenty-four to twenty-seven years age groups respectively. Seventy-four percent of the respondents are under twenty-four years old.

Among the sample students, (56.7%) of them have joined part time job and (43.3%) are not employed. According to the results, it was found that majority of the students work in part-time job. Similarly, it was discovered that as they have their own income, they can use SNS more.

Regarding the education levels, almost (31.9%) of the respondents were the first year students. On the other hand, (25.1%) of the respondents were the second year students and (22.8%) of the respondents were the third year students.

According to the classification of the residence, most of the students (65.5%) live with their family at home. The second largest proportion, (17.6%) of the students live with friends at apartment. According to the results, only (1.6%) of the respondents live at university hostel.

Table 4.1 Distribution of the Respondents' Demographic Characteristic

Variables (n=386)	Number of Students	Percentage (%)
Gender		
Male	153	39.6
Female	233	60.4
Age Group (Year)		
16 - 19	104	26.9
20 - 23	180	46.6
24 - 27	102	26.4
Occupation		
Employed	219	56.7
Unemployed	167	43.3
Education Level		
First Year	123	31.9
Second Year	97	25.1
Third Year	88	22.8
Final Year	78	20.2
Residence		
University Hostel	6	1.6
Private Hostel	59	15.3
Room share with Friends	68	17.6
Home with Family	253	65.5

Source: Survey Data, 2019

4.1.2 Students' Use of SNS

According to the results Table (4.2), (38.9%) of the students have been using SNS for five years and above, following (26.9%) students who have been using SNS for three to five years. Only (14.2%) of the students have started using SNS for one year.

As the results, (38.6%) of the students spend three hours and above on SNS daily. Majority of the students, i.e. (43%) spend one hour to three hours on SNS daily. Eighteen percent of the respondents spend less than one hour on SNS daily.

Facebook is the most favorite among students with (98.7%). Viber is the second with (67.1%) and the third is YouTube with (53.6%). Twenty-eight percent of students use Instagram and (13.5%) of students use Line. Only (0.8%) of students use Dating Sites and Google.

Table 4.2 Distribution of the Students' Use of SNS

Variables (n=386)	Number of Students	Percentage (%)
Experience of Using SNS		
Less Than 1 Year	55	14.2
1 Year to Less Than 3 Year	77	19.9
3 Year to Less Than 5 Year	104	26.9
5 Year and above	150	38.9
SNS Used Time per Day		
Less Than 1 Hour	71	18.4
1 Hour to 3 Hours	166	43.0
3 Hours and Above	149	38.6
Name of SNS		
Facebook	381	98.7
Viber	259	67.1
YouTube	207	53.6
Instagram	109	28.2
Line	52	13.5
Whatsapp	25	6.5
LinkedIn	21	1.9
Wechat	15	5.4
Wiki	14	3.6
Twitter	12	3.1
Dating Site	3	0.8
Google	3	0.8

Source: Survey Data, 2019

4.1.3 Reasons of Using SNS

Reasons of using SNS were explored with multiple response type of question including fifteen options to be selected. (386) respondents mentioned (3,701) responses, which were categorized into nine groups, shown in Table (4.3).

The major reason for using SNS is studying, learning and searching for education (35.4%), reading and sharing for knowledge (14.8%), as source of recreation

and relaxation for entertainment (13.0%). Those students who use online game are found to be (5.9%) as shown in research findings.

Table 4.3 Reasons of Using SNS

Variables (n=386)	Number of Students	Percentage (%)
Reasons of Using SNS		
Education	1312	35.4
Knowledge	548	14.8
Entertainment	480	13.0
Online E-book	284	7.7
Philanthropy	262	7.1
Online Shopping	243	6.6
Online Game	219	5.9
Chatting	197	5.3
Beauty and Fashion	156	4.2

Source: Survey Data, 2019

4.2 Reliability Test

Reliability test is used to test consistency. There are a number of differently used reliability coefficients. One of the most commonly used is Cronbach's Alpha which can be interpreted as a correlation coefficient; it ranges a value from 0 to 1. In this study, reliability test is done to all questions except Question 10.

Table 4.4 Reliability Statistics

Cronbach's Alpha	Number of Items
0.779	19

Source: Survey Data, 2019

Alpha is greater than (0.7), it means that high reliability and Alpha is smaller than (0.3), it means low reliability. According to the results shown in Table (4.4), total statistics of overall questions of Cronbach's alpha reliability coefficient is calculated as 0.779 with (19) items shown as highly reliable result.

4.3 Kaiser-Meyer-Olkin (KMO) Test

The Kaiser-Meyer-Olkin (KMO) is the measure of sampling adequacy, which varies between 0 and 1. The value closer to 1 are better and the value of 0.6 is the suggested minimum.

Table 4.5 Kaiser-Meyer-Olkin (KMO) Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.753
Chi-Square	1602.486
Degree of freedom (df)	91
p-value	0.000

Source: Survey Data, 2019

The Kaiser-Meyer-Olkin (KMO) test shown in Table (4.5) as measures of the sampling adequacy values is 0.753 and Chi-Square value is 1602.486 and an associated degree of significance is smaller than 0.001. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.753 which collected a sample that is adequate.

4.4 Correlation Analysis

Hypothesis: There is relationship between "SNS used time per day" with "average study hours per day, health and privacy issues" of students.

The correlation between SNS used time per day with average study hours per day, health issue and privacy issue is shown in Table (4.6). The correlation between the SNS used time per day with average study hours per day are negatively related at (0.01) level. The correlation between the SNS used time per day with average study hours per day is (-0.400). The SNS used time per day of students is positively related to both their health issue and privacy issue. The correlation between the SNS used time per day and health issue is (0.246) while the correlation between the SNS used time per day and privacy issue is (0.246) and both correlations are significant at (0.01) level.

Table 4.6 Pearson Correlation between SNS Used Time per Day and the Three Dependent Variables

Variables (n=386)	SNS used time per day	Average Study Hours per day	Health Issue	Privacy Issue
SNS Use time per day	1	-0.400 (0.000)	0.246 (0.000)	0.246 (0.000)
Average Study Hours per day	-0.400 (0.000)	1	-0.176 (0.000)	-0.197 (0.000)
Health Issue	0.246 (0.000)	-0.176 (0.000)	1	0.253 (0.000)
Privacy Issue	0.246 (0.000)	-0.197 (0.000)	0.253 (0.000)	1

Source: Survey Data, 2019
p-values are shown in the parentheses.

4.5 Results of Multivariate Analysis of Variance (MANOVA)

4.5.1 Multivariate Outliers Test

The assumption before MANOVA is used to check whether outlier values are included in dependent variables. In this study, dependent variables like average study hours per day, health issue and privacy issue, to check whether the outlier's values are included or not, using box plot. According to the Figure (4.1), among three dependents variables, it can be decided as outlier's values that are not included.

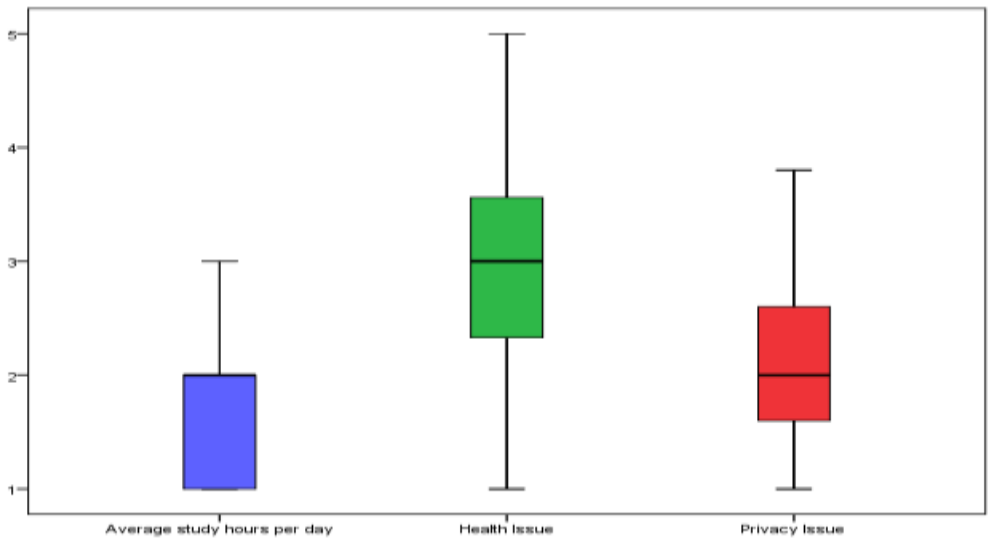

Figure 4.1 Box Plot for Three Dependent Variables

4.5.2 Results Showing the Effect of SNS Used Time per Day on Average Study Hours per Day, Health and Privacy Issues of Undergraduate Students in Dagon University

The results of average study hours per day, health issue and privacy issue by SNS used time per day are presented in Table (4.7). The range of their average study hours per day is (1.44) to (2.18), means the duration of the study hours per day is found to be about 1.44 hours to 2.18 hours per day.

Hypothesis: There is the effect of SNS used time per day on average study hours per day, health and privacy issues of students.

The results of the multivariate test revealed that the effect of SNS used time per day on the average study hours per day, health and privacy issues at $\alpha = 0.01$ level. The results of analysis showed that the average study hours per day vary depending on SNS used time per day.

Similarly, it was also found that their SNS used time per day affects on health and privacy issues at $\alpha = 0.01$ level.

Table 4.7 Results Showing the Effect of SNS Used Time per Day on Average Study Hours per Day, Health and Privacy Issues

SNS Used Time Per Day	n= 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
Less Than 1hr	71	2.183	2.547	1.924
1hr to 3hrs	166	1.928	2.973	2.004
3hrs And Above	149	1.436	3.147	2.358
Univariate (F)		38.157	13.534	14.264
p-value		0.000	0.000	0.000
Wilks' Lambda = 17.719 p-value = 0.000				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

4.5.3 Results Showing the Effect of Students' Demographic Characteristics on Students' Average Study Hours per Day, Health and Privacy Issues of Undergraduate Students in Dagon University

Gender

The results of the students' average study hours per day, health issue and privacy issue by their gender are presented in Table (4.8).

Hypothesis: There is the effect of the gender on the average study hours per day, health and privacy issues of students.

The Table (4.8) shows that gender difference has no effect on the average study hours per day, health and privacy issues.

Table 4.8 Results Showing the Effect of Gender on Students' Average Study Hours per Day, Health and Privacy Issues

Gender	n = 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
Male	153	1.850	2.910	2.182
Female	233	1.742	2.996	2.089
Univariate (F)		2.078	0.998	1.570
p-value		0.150	0.318	0.211
Wilks' Lambda = 1.958 p-value = 0.120				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Age Group

The results of the students' average study hours per day, health issue and privacy issue by their age group are presented in Table (4.9).

Hypothesis: There is the effect of age group on the average study hours per day, health and privacy issues of students.

The results of the multivariate test revealed that the effect of the age groups on the average study hours per day at $\alpha = 0.05$ level. The average study hours per day of sixteen to nineteen years age group is the highest among three groups.

According to the results, their different age group have no effect on the health and privacy issues at $\alpha = 0.01$ level.

Table 4.9 Results Showing the Effect of Students' Age Group on Students' Average Study Hours per Day, Health and Privacy Issues

Age Group	n = 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
16 to 19	104	1.971	2.984	2.112
20 to 23	180	1.656	2.966	2.138
24 to 27	102	1.824	2.931	2.120
Univariate (F)		6.811	0.112	0.050
p-value		0.001	0.894	0.951
Wilks' Lambda = 2.387 p-value = 0.027				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Education Level

The results of the students' average study hours per day, health issue and privacy issue by their education level are presented in Table (4.10).

Hypothesis: There is the effect of education level on the average study hours per day, health and privacy issues of students.

The results of the multivariate test revealed that the effect of education level on health and privacy issues was at $\alpha = 0.1$ level. The results of analysis showed that different education levels have different effects on health and privacy issues.

According to the results, it was found that their education level has no effect on their average study hours per day.

Table 4.10 Results Showing the Effect of Students' Education Level on Students' Average Study Hours per Day, Health and Privacy Issues

Education Level	n = 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
First Year	123	1.691	3.044	2.098
Second Year	97	1.866	3.052	2.278
Third Year	88	1.807	2.692	2.034
Final Year	78	1.808	3.024	2.085
Univariate (F)		1.176	4.173	2.157
p-value		0.319	0.006	0.093
Wilks' Lambda = 2.484 p-value = 0.008				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Occupation

The results of the students' average study hours per day, health issue and privacy issue by their occupation are presented in Table (4.11).

Hypothesis: There is the effect of the occupation on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed that the effect of occupation on the average study hours per day at $\alpha = 0.01$ level. The average study hour per day of the students who do their part-time job is found to be less than those of the students who do not have their part-time job.

According to the results, students' occupation has no different effect on the health and privacy issues at $\alpha = 0.01$ level.

Table 4.11 Results Showing the Effect of Students' Occupation on Students' Average Study Hours per Day, Health and Privacy Issues

Occupation	n = 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
Employed	219	1.699	3.006	2.106
Unemployed	167	1.898	2.904	2.152
Univariate (F)		7.494	1.453	0.401
p-value		0.006	0.229	0.527
Wilks' Lambda = 3.347 p-value = 0.019				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.

Source: Survey Data, 2019

Residence

The results of the students' average study hours per day, health issue and privacy issue by residence are presented in Table (4.12).

Hypothesis: There is the effect of students' residence on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed that the effect of residence on the health issue at $\alpha = 0.05$ level. The private hostel students are found to have more health issue than others students.

According to the results, students' residence has no effect on the average study hours per day and privacy issue at $\alpha = 0.05$ level.

Table 4.12 Results Showing the Effect of Students' Residence on Students' Average Study Hours per Day, Health Issue and Privacy Issues

Residence	n = 386	Mean		
		Average Study Hours per Day	Health Issue	Privacy Issue
University Hostel	6	1.833	2.387	2.100
Private Hostel	59	1.729	3.186	1.993
Room Share with Friends	68	1.632	2.805	2.044
Home with Family	253	1.838	2.965	2.179
Univariate (F)		1.631	3.298	1.478
p-value		0.182	0.021	0.220
Wilks' Lambda = 2.586 p-value = 0.006				

Dependent Variables: Study Hours, Health Issue and Privacy Issue.

Source: Survey Data, 2019

4.5.4 Results Showing the Interrelation Effect of Demographic Characteristics and SNS Used Time per Day on Average Study Hours per Day, Health and Privacy Issues of the Undergraduate Students in Dagon University

Gender

The results of the average study hours per day, health and privacy issues by gender and SNS used time per day are presented in Table (4.13).

Hypothesis: There is the interaction effect of students' gender and SNS used time per day on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed that the interaction effect of the gender and the SNS used time per day was significant at $\alpha = 0.01$ level. The results MANOVA showed the significant gender and SNS used time per day interaction effect for health and privacy issues at $\alpha = 0.01$ level.

It is also found that for less than one hour SNS used time per day, health and privacy issues of male is more than female's health and privacy issues. Similarly, for one hour to three hours SNS used time per day, the male's health and privacy issues is more than both issues of female. On the other hand, for three hours and above SNS used

time per day, the female's health and privacy issues are more than male's health and privacy issues.

However, the interrelation between respondents' gender and SNS used time per categorization does not have any effect on average study hours per day.

Table 4.13 Results Showing the Interrelation Effect of Gender and SNS Used Time per Day on the Students' Average Study Hours per Day, Health and Privacy Issues

Gender	SNS Used Time per Day	n = 386	Mean		
			Average Study Hours per Day	Health Issue	Privacy Issue
Male	Less than 1hr	36	2.278	2.632	2.000
	1hr to 3hrs	64	1.969	3.086	2.219
	3hrs and above	53	1.415	2.885	2.260
Female	Less than 1hr	35	2.086	2.460	1.846
	1hr to 3hrs	102	1.902	2.902	1.869
	3hrs and above	96	1.448	3.291	2.412
Univariate (F)			0.700	5.871	5.048
p-value			0.497	0.003	0.007
Wilks' Lambda = 3.494 p-value = 0.002					

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Age Group

The results of the average study hours per day, health and privacy issues by the age group and SNS used time per day are presented in Table (4.14).

Hypothesis: There is the interaction effect of the age group and SNS used time per day on the average study hours per day, health and privacy issues of the students.

On studying the interaction effect of respondents' age groups and SNS use time per day there is no significant effect on the average study hours per day, health and privacy issues.

Table 4.14 Results Showing the Interrelation Effect of Age Group and SNS Used Time per Day on the Students' Average Study Hours per Day, Health and Privacy Issues

Age Group	SNS Used Time per Day	n = 386	Mean		
			Average Study Hours per Day	Health Issue	Privacy Issue
16 to 19	Less than 1hr	23	2.304	2.627	1.896
	1hr to 3hrs	43	2.256	3.079	1.963
	3hrs and above	38	1.447	3.093	2.411
20 to 23	Less than 1hr	26	1.885	2.602	1.931
	1hr to 3hrs	92	1.728	2.916	2.035
	3hrs and above	62	1.452	3.192	2.377
24 to 27	Less than 1hr	22	2.409	2.398	1.945
	1hr to 3hrs	31	2.065	2.993	1.968
	3hrs and above	49	1.408	3.131	2.294
Univariate (F)			3.460	0.560	0.163
p-value			0.009	0.692	0.957
Wilks' Lambda = 1.475 p-value = 0.127					

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Occupation

The results of the average study hours per day, health and privacy issues by the occupation and SNS used time per day are presented in Table (4.15).

Hypothesis: There is the interaction effect of the occupation and SNS used time per day on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed that the interaction effect of the occupation and their SNS used time per day significant at $\alpha = 0.01$ level. The results of MANOVA showed the significant occupation and SNS used time per day interaction effect for all dependent variables at $\alpha = 0.1$ level.

According to the results, the average study hours per day of the employed is less than the average study hours per day of the unemployed for all SNS used time per day groups.

Based on the results, for less than three hours SNS used time per day, health and privacy issues of the unemployed is more than the employed' health and privacy issues. On the other hand, it is observed that for three hours and above SNS used time per day, the employed' health and privacy issues are slightly higher than the health and privacy issues of the unemployed.

Table 4.15 Results Showing the Interrelation Effect of Occupation and SNS Used Time per Day on the Students' Average Study Hours per Day, Health and Privacy Issues

Occupation	SNS Used Time per Day	n = 386	Mean		
			Average Study Hours per Day	Health Issue	Privacy Issue
Employed	Less than 1hr	32	2.031	2.108	1.569
	1hr to 3hrs	93	1.828	2.937	2.000
	3hrs and above	94	1.357	3.199	2.387
Unemployed	Less than 1hr	39	2.308	2.227	2.215
	1hr to 3hrs	73	2.055	3.056	2.006
	3hrs and above	55	1.400	3.181	2.309
Univariate (F)			2.339	7.779	7.487
p-value			0.098	0.000	0.001
Wilks' Lambda = 7.607 p-value = 0.000					

Dependent Variables: Study Hours, Health Issue and Privacy Issue.
Source: Survey Data, 2019

Education Level

The results of the average study hours per day, health and privacy issues by their education level and SNS used time per day are presented in Table (4.16).

Hypothesis: There is the interaction effect of students' education level and SNS used time per day on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed the interaction effect of the education level and their SNS used time per day significant at $\alpha = 0.05$ level. The results MANOVA showed the significant education level and SNS used time per day interaction effect for only one privacy issue at $\alpha = 0.01$ level.

The interaction effect of education level and SNS used time per day on the privacy issue found that the higher the SNS used time per day, the greater effect on the privacy issue for all education levels.

However, the interaction of the respondents' education level and their SNS used time per day does not have any effect on their average study hours per day and their health issue.

Table 4.16 Results Showing the Interrelation Effect of Education Level and SNS Used Time per Day on the Students' Average Study Hours per Day, Their Health and Privacy Issue

Education Level	SNS Used Time per Day	n = 386	Mean		
			Average Study Hours per Day	Health Issue	Privacy Issue
First Year	Less than 1hr	17	2.000	2.672	1.976
	1hr to 3hrs	60	1.850	3.077	2.100
	3hrs and above	46	1.370	3.279	2.139
Second Year	Less than 1hr	17	2.412	2.575	1.871
	1hr to 3hrs	50	1.940	3.077	2.064
	3hrs and above	30	1.433	3.279	2.867
Third Year	Less than 1hr	23	2.217	2.212	1.683
	1hr to 3hrs	24	1.958	2.514	2.017
	3hrs and above	41	1.463	3.065	2.249
Final Year	Less than 1hr	14	2.071	2.913	1.771
	1hr to 3hrs	32	2.031	2.972	1.969
	3hrs and above	32	1.406	3.124	2.337
Univariate F			0.528	1.123	3.640
p-value			0.787	0.384	0.002
Wilks' Lambda = 1.726 p-value = 0.030					

Dependent Variables: Study Hours, Health Issue and Privacy Issue.

Source: Survey Data, 2019

Residence

The results of the average study hours per day, health and privacy issues by the residence and SNS used time per day are presented in Table (4.17).

Hypothesis: There is the interaction effect of the residence and SNS used time per day on the average study hours per day, health and privacy issues of the students.

The results of the multivariate test revealed that the interaction effect of the residence and their SNS used time per day significant at $\alpha = 0.01$ level. The results MANOVA showed the significant residence and SNS used time per day interaction effect for all dependent variables at $\alpha = 0.05$ level.

The interaction effect of residence and SNS used time per day on the average study hours per day found that the average study hours per day of students who live with family at home are more than others for all SNS used time per day levels.

It is also found that the interaction effect of residence and SNS used time per day on the health issue of the private hostel students is more than others for all levels of SNS used time per day.

On the other hand, interaction effect of residence and SNS used time per day on the university hostel students who SNS used one hour to three hours has more privacy issue than others groups with same SNS used hour.

Table 4.17 Results Showing the Interrelation Effect of Residence and SNS Used Time per Day on the Students' Average Study Hours per Day, Health and Privacy Issues

Residence	SNS Used Time per Day	n = 386	Mean		
			Average Study Hours per Day	Health Issue	Privacy Issue
University Hostel	1hr to 3hrs	6	1.833	2.387	2.100
Private Hostel	Less than 1hr	7	2.000	3.000	1.000
	1hr to 3hrs	21	1.886	3.172	1.790
	3hrs and above	31	1.290	3.811	2.355
Room Share with Friends	Less than 1hr	11	2.091	1.968	1.800
	1hr to 3hrs	28	1.607	2.224	1.972
	3hrs and above	29	1.414	2.430	2.214
Home with Family	Less than 1hr	53	2.226	2.500	1.986
	1hr to 3hrs	111	1.946	2.860	2.072
	3hrs and above	89	1.546	3.372	2.485
Univariate (F)			2.898	19.107	6.454
p-value			0.022	0.000	0.000
Wilks' Lambda = 8.951 p-value = 0.000					

Dependent Variables: Study Hours, Health Issue and Privacy Issue.

Source: Survey Data, 2019

CHAPTER V
CONCLUSION

5.1 Findings

This study has focused on the behavior of SNS use and its effect on undergraduate students of Dagon University students in the academic year 2018-2019. The sample size, (386) of students were selected by using stratified random sampling. Data collection was done in July 2019.

In this study, female respondents are more than males. Two third of the respondents are under twenty-four years old. One third of the respondents are first year students. More than half of the respondents have joined part time job. Two third of the respondents live with their family at home. One third of the students have been using SNS for less than three years. Most of the students spend more than one hour on SNS daily. It is found that almost all the sample students used Facebook, followed by Viber, YouTube and Instagram. The students used SNS mainly for their education, knowledge sharing and entertainment.

In the reliability analysis, the total items have high level of internal consistency because the Cronbach's alpha value is more than 0.7. Based on the KMO test, the items analysis suitable to analyze the survey data of sampling is adequate because the measure of sampling adequacy is more than 0.6.

According the correlation analysis, the SNS used time per day is negatively related to the average study hours per day. So if the students' SNS use time per day increases, their average study hours per day will decrease. On the other hand, the SNS used time per day is positively related to both health and privacy issues. If the SNS used time per day increases, health and privacy issue of students will also increase.

After analyzing the data using MANOVA, it was found that if the SNS used time per day varies, average study hours per day, health and privacy issues of the students can be different. The youngest age group's average study hours per day is the highest among three groups. The diverse education levels have different effects on both health and privacy issues. On the other hand, the average study hours per day of the

unemployed students is more than those of the employed students. The health issue of the private hostel students is more than others students.

Female who use three hours and above per day on SNS, have more health and privacy issues than male who use same hour on SNS. In addition, the employed who use three hours and above per day on SNS, have more health and privacy issues than unemployed use same hour. The second year students who use three hours and above have only more privacy issue than other education level.

The average study hour per day of the students who live with family at home is more than others type of residence regardless of SNS used time per day. The university hostel students who use one to three hours has more privacy issue than others groups of same hour. The private hostel students have more health issue than other groups regardless of SNS use time per day.

To sum up, SNS appear not only gratification and benefit but also lower study hour, social problem, addiction and health and privacy issues of students.

5.2 Recommendations and Further Research

According to the results of this study, it is clearly found that the students' SNS use time per day affects the study hour, health and privacy issues of the students. Therefore, the students may face health and social problems, limitations on exercises, loss of taste and deficiency and so on.

Although the world is a global village and everybody is connected to one another in enormous network generated by the internet, the student should not spend most of their time on using SNS. So, it is recommended to use SNS with the restricted time and they should focus their SNS use to support their education and to improve knowledge only.

This study only emphasises on undergraduate students in Dagon University. Therefore, future studies should be conducted in commercial sector, society and other aspects by using similar method so that a comparative analysis can be explored.

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APPENDIX

Mingalarpar!

Well, I'm Aye Aye Myo, the MAS student from University of Economics, Yangon. I promise that this is to be used in my thesis paper only. And I guaranteed that your personal data will be kept confidential. Thus, you are requested to answer frankly and your participation is highly appreciated:

1. Which Social Network Site that you usually use?
    1. Facebook
    2. Youtube
    3. Whatsapp
    4. Viber
    5. Twitter
    6. Likedin
    7. Instagram
    8. Wiki
    9. Line
    10. Dating Networking Sites
    11. Others (Pls. Specify) ……
2. How long have you been using Social Network Sites (eg., Facebook)?
    1. Under one year
    2. One year but less than 3 years
    3. Three years but less than 5 years
    4. Five years & above
3. How often do you use the Social Site (eg. Facebook) in one day?
    1. Less than an hour
    2. One hour but less than three hours
    3. Three hours but less than five hours
    4. Five hours but less than seven hours
    5. Seven hours and above

Reason for use

4. Please tell us the reason why you are using Social Networking Sites

    Using the Social Networking Sites (eg., Facebook) for:

    1. learning International Languages
    2. making discussion about lectures with friends

3. asking questions and discussion regarding the subject between teachers and yourself.
4. learning for academic purpose.
5. reading Online book
6. sharing knowledge regarding education.
7. reading about policies, literatures.
8. doing philanthropic
9. watching movies, drama series and funny video (comedies)
10. listening to International music and K-Pop
11. playing games
12. chit-chatting with friends and families.
13. beauty & Fashion
14. buying things from online shopping
15. selling things through online shopping

Privacy Issue

5. Do you usually use to play the funny games on Social Networking Sites (eg. Facebook)? – (such as – Do you won the lottery in the year 2020? and so on). Kindly answer by 5 point skills.

Always play	Used to play	Normal	Hardly ever	Never play
5	4	3	2	1

6. Do you usually watch the videos from Youtube or links sent by others from Social Networking Sites (eg., Facebook messengers)?

Always watch	Yes, I watch	Normal	Don’t watch	Never watch
5	4	3	2	1

7. Do you share your personal information at Social Networking Site (eg. Facebook) – such as – Your job, phone number, photo, township that you live etc.

Always share	Sometime share	Normal	Don't Share	Never share
5	4	3	2	1

8. Have you ever encountered your Facebook account was hacked or cracked by others?

Often being hacked	Experienced of being hacked	Normal	No	Completely Not
5	4	3	2	1

9. Have you ever faced with threatening and coercion by using social networking sites?

Yes, very often	Yes	Normal	No, didn't faced before	Never
5	4	3	2	1

Study Hours

10. How many study hours per day on average?
    1. Less than one hour
    2. One hour but less than two hours
    3. Two hours but less than three hours
    4. Three hours but less than Four hours
    5. Four hours and above
11. Impact on learning by using Social Networking Sites (eg. Facebook)

Extreme impact	Yes, there is	Normal	No, there is no impact	Totally not
5	4	3	2	1

12. Do you agree that you cannot complete your lessons because of using Social Networking Sites (eg, Facebook)?

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

13. Do you agree that it is a big challenge of reducing learning hours by using Social Networking Sites (eg. Facebook)

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

14. Do you agree the point that you give more time in using Social Networking Sites (eg. Facebook) than study time.

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

15. Do you agree the point that the result of studying is stops improving while you started using the Social Networking Sites (eg. Facebook).

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

Health Issue

16. Do you suffer muscles tiredness of your hands (such as stiffness of fingers, by using long hours of Social Networking Sites (eg. Facebook)?

Suffer Extremely	Suffer	Normal	Not Suffer	Completely Not
5	4	3	2	1

17. Do you suffer problems in eye sights (such as eye strain, blurred visions, excess tearing) by using long hours of Social Networking Sites (eg. Facebook)?

Suffer Extremely	Suffer	Normal	Not Suffer	Completely Not
5	4	3	2	1

18. Have you ever suffered from the health problem like – headache, neck muscle pain, etc.?

Suffer Extremely	Suffer	Normal	Not Suffer	Completely Not
5	4	3	2	1

19. Are you aware of thirst or hunger while using Social Networking Sites (eg. Facebook)?

Absolutely Yes	Yes it is	Normal	Not aware	Totally not aware of it
5	4	3	2	1

20. Do you feel like lack of sleep by using late of Social Networking Sites (eg. Facebook) late at night?

Suffer Extremely	Suffer	Normal	Not Suffer	Completely Not
5	4	3	2	1

21. Do you neglect doing household chores very often by using Social Networking Sites (eg. Facebook)?

Totally neglect	Neglect	Normal	No, I didn't	No, totally not
5	4	3	2	1

22. Do you prefer using Social Networking Sites (eg. Facebook) to spending times with friends?

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

23. Do you prefer using Social Networking Sites (eg. Facebook) to doing sports?

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

24. Do you prefer using Social Networking Sites (eg. Facebook) to watching TV?

Totally agree	Agree	Normal	Disagree	Totally Disagree
5	4	3	2	1

Demographic Questions

1. How old are you? ( ) years
2. What is your gender?
    0. Male
    1. Female
3. What is your academic year of the study?
    1. First year
    2. Second year
    3. Third year
    4. Final year
    5. Others
4. Where do you live and with whom?
    1. University Hostel
    2. Private Hostel (Rent Hostel)
    3. Room shared with friends
    4. Staying at home with family
    5. Others (Please Specify) …….
5. Are you working part time job?
    0. No
    1. Yes